

VOTING CLASSIFIER

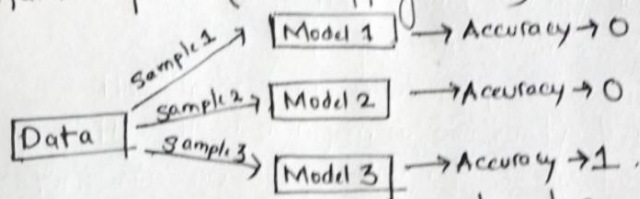
A voting classifier is a machine learning model that trains on an ensemble of numerous models and predicts an output (class) based on their highest probability of chosen class the output. It simply aggregates the finding of each classifier passed into Voting Classifier and predicts the output class based on the highest majority of voting. This idea is instead of creating separated dedicated model and finding the accuracy for each them, we created a single model which train by these model and predicts output based on their combined majority of voting for each output class.

Voting classifier Support two types of voting -

1. **Hard Voting** - In hard voting, the predicted output class is a class with the highest majority of votes i.e, the class which had the highest probability of being predicted by each of the classifiers. Suppose three classifiers predicted the output class (A, A, B) so here the majority predicted A as output. Hence A will be the final prediction.
2. **Soft Voting** - In soft voting, the output class is the prediction based on the average of probability given to the class. Suppose given some input to three models, the prediction probability for class $A = (0.30, 0.47, 0.53)$ and $B = (0.20, 0.32, 0.40)$. So the average for class A is 0.4333 and B is 0.3067, the winner is clearly class A because it had highest probability averaged by each classifier.

Mostly voting classifiers are used in Ensemble techniques. Mainly in ensemble we have two types first is bagging and second is boosting (XGBoost, ADABOOST) (Random forest)

Random forest (Bootstrapping method)



Based on votes, 0 have the most votes.
So, output accuracy/output Class is 0.
This is known as **Hard Voting Classifier**.

→ In **Soft voting classifier**, it give us probabilities.

→ Suppose

	Class 0	Class 1
Model 1 =	0.1	0.9
Model 2 =	0.2	0.8
Model 3 =	0.3	0.7
Model 4 =	0.4	0.6
Average	0.15	0.85

→ So we choose Class 1 as final class because of high probability.